Low Cost High Data Rate Portable Ground Station

Completed Technology Project (2015 - 2016)

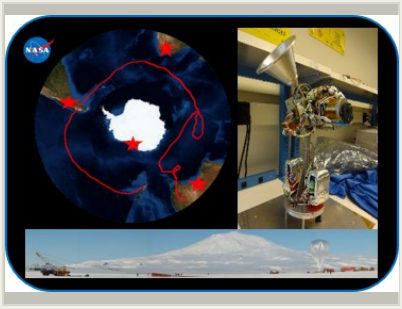
Project Introduction

The Low Cost High Data Rate Portable Ground Station project will develop the basis of a low cost, portable, remotely configurable ground station to receive high rate data from high-altitude scientific balloon missions, with extensibility to smallsat and cubesat platforms, by leveraging existing hardware and software.

The Low Cost High Data Rate Portable Ground Station will be based on an existing X/Y gimbal antenna pedestal that is used to track the Tracking and Data Relay Satellite System (TDRSS) on-board high altitude Long and Ultra Long Duration Balloon (LDB and ULDB) missions. The pedestal is capable of full hemispherical coverage and is coupled with an attitude determining GPS system and a microcontroller to actively point the attached 18" circularly polarized array antenna to an available TDRS. To realize a low cost high data rate ground station, the existing X/Y gimbal and antenna pedestal will be modified to support array antennas up to a few meters in diameter to achieve higher gain while the control software will be modified to actively and accurately track a high altitude balloon. Link margins will be developed to determine the optimal link architecture between the balloon and the ground station and a ground antenna will be selected for further charaterization testing. In addition, an architecture will be developed for the supporting ground station equipment that will be required to fully implement the concept of a portable ground station.

Anticipated Benefits

N/A



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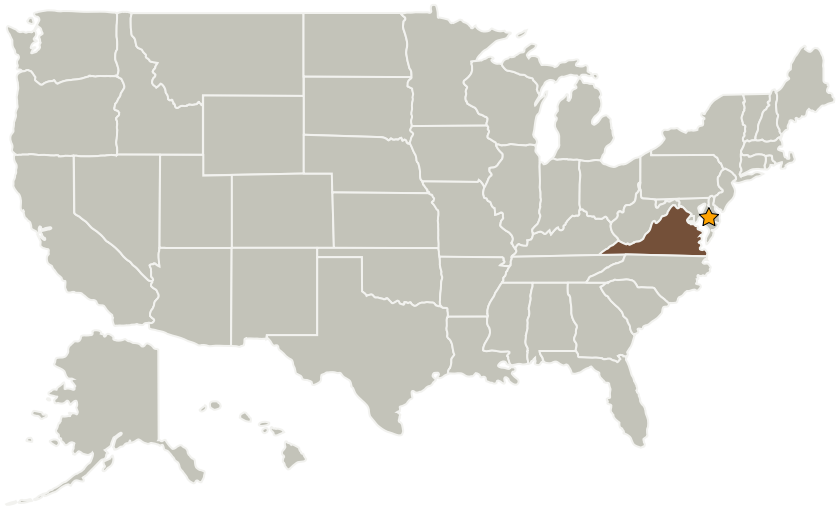
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Wallops Flight Facility(WFF)	Lead Organization	NASA Facility	Wallops Island, Virginia

Primary U.S. Work Locations
Virginia

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Wallops Flight Facility (WFF)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Managers:

Daniel A Mullinix
Wesley A Powell

Principal Investigator:

Brian S Abresch

Co-Investigators:

Negeen Saghafi
Abel C Duer
Kenneth E Hall
Amy L Davis
Samuel M Thompson
Marta B Shelton

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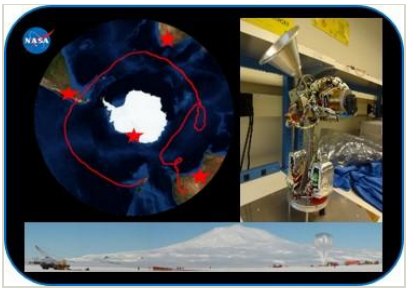
Images



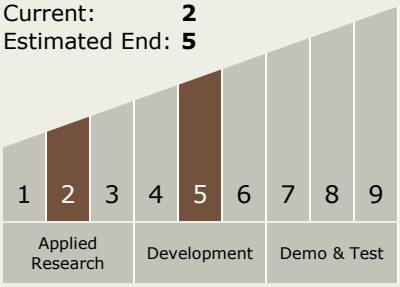
Low Cost High Data Rate Portable Ground Station
Low Cost High Data Rate Portable Ground Station
(https://techport.nasa.gov/image/19079)

Project Website:

http://aetd.gsfc.nasa.gov/

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **5**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.4 Flight and Ground Systems